REMARKS

Claims 1-4, 6, 7 and 20 are pending in the application, and are rejected. Claims 1 and 3 are herein amended.

Claim Rejections under 35 U.S.C. §103

Claims 1-4, 6, 7 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,001,452 to Imai et al. in view of the abstract of JP 01-103994 to Imai et al., along with U.S. Patent No. 5,977,697 to Jin et al.

The Examiner deems Applicant's argument that the combination of Imai et al ('452), Imai et al ('994) and Jin et al. does not teach the limitation of a n-type semiconductor exhibits crystal completeness sufficient to allow operation of said n-type semiconductor diamond as a pn junction device not persuasive. The Examiner asserts that the limitation is held to be inherent to the invention taught by the combination of Imai et al. ('452), Imai et al. ('994) and Jin et al., because the combination of the cited references teach a similar method as claimed for forming an n-type diamond.

Applicants respectfully disagree with the above rejection, because not all of the claimed limitations are taught or suggested by the cited references.

Applicants note that the three steps recited in the present method claims include, in part:

(1) mechanically polishing a diamond substrate; (2) subjecting a surface of the inclined diamond substrate to a smoothening treatment make it even; and (3) exciting a raw material gas ...to grow epitaxially on said smoothened substrate.

The "smoothening treatment" is defined in the specification (and in claim 6) as a treatment of exposing the substrate to the hydrogen plasma of a hydrogen pressure of 10 to 50

Torr and a microwave output of 200 to 1200 W at a substrate temperature of 700 to 1200 °C for a period of 0.5 hours to 5 hours, thereby to make the substrate surface to consist of steps each in the order of an atomic layer. Applicants note that achievement of such small steps is not reached without the claimed treatment.

This step of treating the substrate is not taught by the combination of the cited references. The Examiner cites Jin et al., asserting that the reference teaches "smoothing a substrate" to remove amorphous phases (col. 5, line 15-67). The Examiner asserts that Jin et al. teaches that the hydrogen plasma treatment cleans the diamond surface by removing carbonaceous and oxygen or nitrogen-related contaminants, introduces a hydrogen-terminated diamond surface, and removes graphite or amorphous carbon phases present on the surface and along the grain boundaries.

Applicants respectfully disagree with the Examiner's characterization of Jin it al. The cited reference does not show hydrogen plasma treatment of a substrate. Rather, Jin et al. shows hydrogen plasma treatment of a diamond particle layer that has been already deposited on a substrate. Jin et al. does not teach or suggest such treatment of a substrate that does not already have a diamond particle layer previously deposited thereon. A substrate with steps of one ~~μm height~~ **atomic layer height** is neither taught nor suggested nor achieved by the combination of the cited references, and the parameters as claimed in claim 1 are not achieved either.

Therefore, the Examiner appears to assert that the plasma treatment of the diamond particle layer of Jin et al. would have provided suggestion to one skilled in the art to use the plasma treatment on the substrate, rather than on a layer deposited on the substrate. The Examiner apparently asserts that because the hydrogen plasma treatment of Jin et al. cleans the diamond surface by removing carbonaceous and oxygen or nitrogen-related contaminants,

introduces a hydrogen-terminated diamond surface, and removes graphite or amorphous carbon phases present on the surface and along the grain boundaries, such a treatment would have been applicable and desirable for substrates.

Therefore, it should be clear that the cited combination of references fails to show all the claimed limitations, and that the modification of Jin et al. to expose the substrate to plasma treatment would not have been made by one skilled in the art.

Respectfully submitted,

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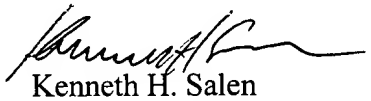

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